

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
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)	
Revision of Part 15 of the Commission's)	ET Docket No. 13-49
Rules To Permit Unlicensed National)	
Information Infrastructure (U-NII))	
Devices in the 5 GHz Band)	

COMMENTS OF UBIQUITI NETWORKS, INC.

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EXECUTIVE SUMMARY

Ubiquiti Networks, Inc., a publicly traded high-performance networking technology company, submits these comments to address the Commission’s request for input on two proposed implementation plans for frequency sharing in the U-NII-4 band between DSRC systems, unlicensed users, and incumbent services. Ubiquiti also offers a compromise proposal for unlicensed outdoor operations that would enable robust unlicensed use of the U-NII-4 band while minimizing risk to DSRC. Ubiquiti commends the Commission and parties in this proceeding for the significant effort and commitment to collaborating on a mutually agreeable approach to sharing this important band. Ubiquiti is fully aligned with the Commission’s goals to make available a significant amount of spectrum for unlicensed services on a shared basis while enabling the continued development of innovative DSRC services. This proceeding represents a valuable opportunity to share spectrum in a manner that fosters innovation for both unlicensed devices and DSRC services. Ubiquiti also applauds the Commission’s continued vigilance and dedication to investigating technical solutions that optimize sharing of the 5.9 GHz band while offering sufficient protection for its users.

Ubiquiti encourages the Commission to adopt “protocol agnostic” technical requirements. Appropriate allocation of spectrum in the U-NII-4 band can enable both wireless internet service providers (WISPs) and Wi-Fi, and support inventive unlicensed uses including long-haul unlicensed devices. As such, a protocol agnostic and flexible approach is critical to ensuring that the technical requirements eventually promulgated will allow for continual innovation in wireless technology.

Additionally, in response to issues raised by the Commission regarding the advantages of a “re-channelization” vs. “detect and avoid” approach to band sharing, Ubiquiti believes that a

re-channelization approach is less desirable. Ubiquiti is concerned that the re-channelization approach provides an inadequate amount of shared spectrum for unlicensed devices and hinders DSRC development by causing significant disruption to existing DSRC equipment and component manufacturers. Ubiquiti also urges the Commission to take note of historical disadvantages in using “listen before talk” technologies for outdoor networks in particular, and supports adopting a modified “detect and avoid” approach to minimize disruption to all U-NII-4 users and maximize use of the band. Ubiquiti’s proposed modifications intend to mitigate potential sharing issues by utilizing a protocol-agnostic method, allowing for unlicensed devices to move to an alternate channel in the event of interference, and avoiding the technical impediments caused by dynamic frequency selection.

In light of the challenges of balancing the sometimes competing demands of prospective U-NII-4 spectrum users, Ubiquiti herein proposes a compromise plan that, in combination with a modified “detect and avoid” approach, will enable robust use of the 5.850-5.925 GHz band for outdoor uses for unlicensed point-to-point operations while minimizing the risk of interference to DSRC. Ubiquiti recognizes that issues relating to frequency sharing may differ depending on the nature of the use: in particular, whether it occurs indoors or outdoors. Adopting an approach that looks only at efficient spectrum sharing of one use may inevitably impede innovation in the other. Thus, Ubiquiti’s compromise proposal addresses outdoor services separately and can allay DSRC or incumbent user concerns unique to outdoor use. Ubiquiti believes that several technical rules can be instituted to minimize outdoor disruption to incumbent users and evolving automobile services, and should be distinct from rules covering indoor unlicensed use, for example: limiting U-NII-4 outdoor use to fixed point-to-point deployments; and employing power control and periodic channel availability checks.

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Ubiquiti Networks, Inc., by its undersigned counsel, herein submits Comments in response to the Commission's June 1, 2016 Public Notice in the above-captioned docket.¹ In the Public Notice, the Commission requests comments to update and refresh the record on the status of potential sharing solutions between proposed Unlicensed National Information Infrastructure ("U-NII") devices² and Dedicated Short Range Communications ("DSRC")³ operations in the 5.850-5.925 GHz ("U-NII-4") band. Based on years of industry experience and its research and development in networking technology, Ubiquiti herein offers its perspective on the alternative sharing proposals under consideration. Ubiquiti is fully aligned with the Commission's goals to make available a significant amount of spectrum for unlicensed services on a shared basis while

¹ *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure(U-NII) Devices in the 5 GHz Band*, ET Docket No. 13-49, Public Notice, FCC 16-68 (rel. Jun. 1, 2016) ("Public Notice").

² U-NII devices provide short-range, high-speed unlicensed wireless connections in the 5 GHz band for, among other applications, Wi-Fi-enabled radio local networks, cordless telephones, and fixed outdoor broadband transceivers used by wireless internet providers.

³ DSRC uses short-range wireless communication links to facilitate information transfer between appropriately-equipped vehicles and appropriately-equipped roadside systems ("vehicle to infrastructure" or "V2I") and between appropriately-equipped vehicles ("vehicle to vehicle" or "V2V").

enabling the continued development of innovative DSRC services. In light of the challenges of balancing these sometimes competing demands, Ubiquiti herein proposes a compromise plan that, in combination with a modified “detect and avoid” approach, will enable robust use of the 5.850-5.925 GHz band for outdoor uses for unlicensed point-to-point operations while minimizing the risk of interference to DSRC.

I. Introduction and Background

Ubiquiti, a publicly-traded company (UBNT; NASDAQ) headquartered in San Jose California, develops high-performance networking technology for service providers and enterprises. Ubiquiti is the largest supplier in the wireless internet service provider (“WISP”) industry and the second largest supplier in the indoor enterprise Wi-Fi market. The company focuses on developing innovative technology with lower deployment costs, such as Ubiquiti’s airMAX, airFiber, and Unifi products that operate on an unlicensed basis in the U-NII and Industrial, Scientific and Medical (“ISM”) bands, and which offer a viable alternative to high cost wireless services. Ubiquiti is deeply committed to technology that makes affordable broadband internet access available to all Americans, especially those in underserved markets and communities. From this perspective, Ubiquiti made significant contributions in earlier stages of this proceeding that were instrumental in the development of revised out-of-band emission (“OOBE”) limits for the UNII-3 band⁴ that added to the flexibility and capability of U-

⁴ See Letter from Ubiquiti Networks to Marlene H. Dortch, Secretary, FCC, ET Docket No. 13-49 (filed Jul. 2, 2015); Letter from Ubiquiti Networks to Marlene H. Dortch, Secretary, FCC, ET Docket No. 13-49 (filed Jun. 1, 2015); Comments in Support of Petition for Reconsideration by WISPA, et al., ET Docket No. 13-49 (filed Jul. 30, 2014).

NII operations at 5 GHz while protecting other authorized users from harmful interference.⁵

The Public Notice follows on the initial 2013 Notice of Proposed Rulemaking in this proceeding⁶ and reflects the ongoing evaluation of potential sharing techniques by the Commission, the Department of Transportation (“DoT”), and certain interests in the wireless communications and automotive industries. The Commission’s stated purpose in this proceeding is to, among other things, develop rules for the U-NII-4 band that will create ways to access spectrum that would, in turn, open new opportunities for entrepreneurs and other new market entrants, promote wireless innovation, and expand broadband deployment.⁷

The Commission now seeks additional information regarding two approaches -- “re-channelization”⁸ and “detect and avoid”⁹ -- that have emerged from the analysis offered by the 802.11 DSRC Coexistence Tiger Team¹⁰ on sharing the 5850-5925 MHz band between DSRC

⁵ *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure(U-NII) Devices in the 5 GHz Band*, ET Docket No. 13-49, Memorandum Opinion and Order, FCC 16-24 (rel. Mar. 2, 2016) (“March 2 Order”).

⁶ *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure(U-NII) Devices in the 5 GHz Band*, ET Docket No. 13-49, Notice of Proposed Rulemaking, 28 FCC Rcd 1769 (2013) (“NPRM”).

⁷ *Id.* at ¶ 75.

⁸ Under this sharing proposal, the DSRC spectrum would be split into two contiguous blocks: one exclusively for safety-related communications and one for non-safety-related communications shared with DSRC service channels. The control channel and the two public safety channels will be located at the top portion of the band and the remaining four DSRC service channels would be reconfigured at the lower end of the band as two 20 megahertz channels.

⁹ Under this sharing proposal, unlicensed devices would monitor the existing 10 megahertz-wide DSRC channels established in the DSRC Report and Order. If an unlicensed device detects any transmitted DSRC signal, it would avoid using the entire DSRC band to assure no interference occurs to DSRC communications. *See* Public Notice at 6; *Amendment of Parts 2 and 90 of the Commission’s Rules to Allocate the 5.850-5.925 GHz Band to the Mobile Service for Dedicated Short Range Communications of Intelligent Transportation Services*, ET Docket No. 98-95, Report and Order, 19 FCC Rcd 2458 (2004) (“DSRC Report and Order”).

¹⁰ IEEE 802.11-15/0347r0, Final Report of DSRC Coexistence Tiger Team at 1 (Mar. 9, 2015) , available at <https://mentor.ieee.org/802.11/dcn/15/11-15-0347-00-0reg-final-report-of-dsrc-coexistence-tiger-teamclean.pdf> (“Tiger Team Final Report”).

and unlicensed U-NII-4 devices. In particular, the Public Notice seeks specific comment on: the respective merits of the two approaches; what, if any, specific interference avoidance mechanisms should be adopted; the role of industry standards-setting bodies; the impact on existing and prospective users of adopting either approach, etc.

Ubiquiti commends the Commission for seeking additional input on how to best implement frequency sharing in the U-NII-4 band. The 5.9 GHz band represents a uniquely valuable opportunity to foster both the continued growth of unlicensed devices and services as well as implementation of innovative DSRC services. As discussed below, Ubiquiti has reviewed the proposals set forth by the IEEE Tiger Team and the findings of the NTIA 5 GHz Report, and offers its analysis based on Ubiquiti's extensive real-world experience and ongoing research and development in high performance technology for the unlicensed market.

From Ubiquiti's perspective as a major U-NII equipment manufacturer, there are four fundamental principles that need to be considered in evaluating approaches to frequency sharing in the UNII-4 band, all of which must be addressed and balanced for the Commission to achieve an optimal outcome:

- a. Minimize disruption for the primary incumbent users
- b. Minimize disruption for equipment manufacturers (both DSRC and U-NII)
- c. Minimize disruption for component manufacturers (both DSRC and U-NII)
- d. Ensure that the inclusion of U-NII devices in the 5850-5925 MHz will have the desired results of providing increased capacity for consumers and facilitating continued growth in the wireless industry.

II. Ubiquiti Supports “Protocol Agnostic” Technical Requirements

As outlined in the Public Notice, despite 18 months of meetings and presentations, the IEEE DSRC Coexistence Tiger Team was unable to reach a consensus regarding the “re-Channelization” and “detect and avoid” proposed sharing methods on which the Commission now seeks comment.¹¹ At the outset, Ubiquiti cautions that the IEEE 802.11 Tiger Team focused solely on using Wi-Fi technology and methodologies in their analysis and in the preparation of their proposals, thus skewing their investigation into what Ubiquiti believes is an overly narrow perspective for this inquiry. While standards can play an important role in the adoption and proliferation of existing technology, they can also impede the introduction of newer, more advanced technologies.

Ubiquiti agrees that a key priority in developing rules for shared usage of the 5850-5925 MHz band is to ensure that the Commission’s actions promote, rather than inhibit, wireless innovation.¹² The Commission can facilitate continued development in wireless devices and services by ensuring that the technical rules adopted do not favor, implicitly or explicitly, the implementation of one unlicensed technology over another and sufficient flexibility is incorporated to allow for a variety of unlicensed devices and services to develop. Ubiquiti is concerned that the adoption of an 802.11-based approach would unintentionally and unnecessarily inhibit the full realization of the potential for the U-NII-4 band to support expanded broadband access and technology innovation, causing the Commission to fall short of achieving the stated goals in this proceeding. Ubiquiti strongly recommends that Commission’s

¹¹ See Tiger Team Final Report at 8.

¹² “Creating ways to access spectrum under a variety of new models, including unlicensed uses, increases opportunity for entrepreneurs and other new market entrants to develop wireless innovations that may not have otherwise been possible under licensed spectrum models.” NPRM at ¶ 75.

rulemaking remain protocol agnostic and that it outline the technical requirements for coexistence without specifying solutions.

III. The “Re-Channelization” Sharing Approach Should Not be Adopted

Ubiquiti has a number of concerns about this proposal and does not support this approach.

A. The “Re-Channelization” Approach Fails to Make Sufficient New Spectrum Available for Unlicensed Devices

The “re-channelization” approach would effectively reduce the usable spectrum for U-NII-4 devices by 30 MHz, or 40% of the new band. This result runs counter to the primary purposes of this proceeding, as stated in the NPRM, of promoting efficient use of radio spectrum through sharing. The initial proposal in this proceeding recommended that seven 10 megahertz channels and a reserve channel be made available for a total of 75 MHz of shared U-NII-4 usage. The Commission recognized in the NPRM that developing significant new spectrum opportunities for unlicensed devices was a priority reflected in Executive Branch policies, Commission proceedings, and recent legislation:¹³

“Wireless broadband services are in high demand by the public and that demand is expected to grow significantly in the coming years ...The U-NII band holds significant promise for helping to accommodate the needs of business and consumers for fixed and mobile broadband communications...”¹⁴

The “re-channelization” approach does not make sufficient shared spectrum available for unlicensed services and will not advance this goal.

¹³ NPRM at ¶ 11-13 (detailing various efforts undertaken by the Executive Branch, Congress, and agencies such as the NTIA and the Departments of Defense and Commerce to address and accommodate unlicensed spectrum use).

¹⁴ NPRM at ¶ 15.

B. The “Re-Channelization” Approach May Hamper DSRC Deployment and Development

Similarly, Ubiquiti observes that this proposal also limits the spectrum that would be available for DSRC to 30 MHz, an amount of spectrum that is significantly less than the existing allocation. Accordingly, Ubiquiti concurs with the concerns expressed by the Department of Transportation as part of its comments offered in Appendix D of the Tiger Team Report. The automotive industry has already made significant investment in DSRC technology in reliance on existing spectrum availability.¹⁵ Moving the DSRC Public Safety and Control Channels to the upper 30 MHz of the band may cause significant disruption to DSRC equipment and component manufacturers, with respect to testing, implementation, and harmonization. Ultimately, a re-channelization approach would likely delay deployment and hinder development of valuable DSRC technology. In addition, the DoT has stated that this approach “appears to be a reallocation of spectrum away from the current incumbent and thus appears to be outside the bounds of the NPRM.”¹⁶

C. “Listen Before Talk” Technologies Have Material Disadvantages When Deployed in Wide Area Networks (WAN) Operating Outdoors

Ubiquiti also objects to the recommendation to employ 802.11 sharing protocols known as Listen Before Talk (“LBT”), Clear Channel Assessment (“CCA”), etc. While such protocols can be effective in ensuring fair access in wireless local area networks (“LAN”) in homes and offices which are often isolated from other RF networks and which have a relatively small number of devices, the effect of these protocols on wide-area, outdoor and often overlapping

¹⁵ See, e.g., *Revision of Part 15 of the Commission’s Rules to Permit Unlicensed National Information Infrastructure(U-NII) Devices in the 5 GHz Band*, ET Docket No. 13-49, Comments of General Motors Company at 6-7 (filed Jul. 6, 2016).

¹⁶ Tiger Team Final Report at 27.

networks with many devices can be very detrimental if not crippling, creating problems such as hidden nodes, excessive latency, and severely limited network capacity,

To overcome these problems, manufacturers of outdoor wireless wide area network (“WAN”) equipment such as Ubiquiti Networks, Cambium Networks, Mimosa Networks, etc., have invested significant resources to develop and deploy technologies which side-step the sharing protocols of 802.11-based equipment to remain competitive. Adopting an LBT-type protocol in the U-NII bands would be a step backwards, significantly reducing network performance for wireless WANs and should not be adopted.

IV. Ubiquiti Supports Adoption of a Modified “Detect and Avoid” Proposal to Provide Sufficient Shared Spectrum for U-NII-4 Devices and Interference Protection for DSRC.

Ubiquiti supports the adoption of the “detect and avoid” proposal provided that the significant modifications outlined below are incorporated into the proposal. Among the benefits of this proposal is the lack of disruption for existing DSRC equipment and component manufacturers, as well as allowing U-NII devices access, on a shared basis, to the full 75 MHz proposed by the Commission in its original NPRM. Further, preservation of the existing frequency scheme would avoid significant disruption to existing DSRC equipment and component manufacturers, and enable that service to continue to develop.

A. UNII-4 Devices Should Be Permitted to Move to an Alternate Channel Rather than Be Required to Vacate the Entire Band.

Ubiquiti urges the Commissions not to adopt the aspect of the Tiger Team’s “detect and avoid” proposal that would require the entire band to be vacated upon detection in a single channel. Such a requirement is overly restrictive and will lead to inefficient spectrum utilization.

The Tiger Team’s approach appears to be based on a feature of the 802.11ac protocol, whereby adjacent channels are monitored to determine if the occupied channel width of the device can be expanded to 40, 80 or even 160 MHz of contiguous spectrum. This implementation assumes that an 802.11ac device would be “parked” in the U-NII-3 spectrum for 20 or 40 MHz operation, for example, and only expand into the proposed U-NII-4 spectrum using the wider channels if there are no DSRC signals present. By precluding devices which support narrower bandwidths from moving to an alternate channel within the U-NII-4 band, such an approach would artificially restrict band utilization and impede the goal of increasing network capacity for consumers.

Ubiquiti notes that in the U-NII-2 bands, where a “detect and avoid” approach is used to protect TDWR and other systems, devices are only required to relocate to an alternate *channel*, not vacate *the entire band* or section of the band. A similar requirement should be adopted for the U-NII-4 band.

B. The CCA Detection Methods Are Not Protocol Agnostic and Should Not be Adopted.

Ubiquiti does not agree with the 802.11-based (CCA) detection methods outlined in the Tiger Team proposal because they are not protocol agnostic. As indicated in the Tiger Team proposal, “[f]rom a practical perspective, non-802.11 devices may not find adding this CCA mechanism cost effective.”¹⁷ In addition, the CCA-based approach will suffer from the same network performance issues as outlined above when implemented in the outdoor WAN environment.

¹⁷ See Tiger Team Final Report at 6.

C. The Commission Should Not Adopt the Tiger Team's Suggested Dynamic Frequency Selection (DFS) Approach

The technical requirements of the Tiger Team's detection method calls for a -85 dBm detection level for a 10 MHz bandwidth, which is impractical under real-world conditions. The thermal noise power (kTB) in a 10 MHz channel is -104 dBm. When one considers that a typical radio receiver noise figure is about 8-10 dB, the -85 dBm detection level is only about 10 dB above the thermal noise floor of the radio, not including increases in the general noise environment induced by other nearby transmitters.

In the real world, such a detector would cause nearly constant false detections and render the band unusable for U-NII devices. False detections continue to be a problem in U-NII-2 band where the DFS detection requirement in the U-NII-2 band is -64 dBm, more than 20 dB above the level proposed by the Tiger Team. The network performance impact of even infrequent false DFS detections often drives wireless WAN operators to avoid the U-NII-2 band in favor of the more congested U-NII-3 band, although the newly approved outdoor U-NII-1 band will provide some relief in this regard. Regardless of the implementation, DFS-like techniques will make the U-NII-4 band less attractive for use by the wireless WAN operators.

V. **The Commission Should Limit Outdoor Operation to Fixed Point-to-Point Deployments.**

The Public Notice invited parties to suggest other approaches that would facilitate unlicensed use of the 5.850-5.925 GHz band without causing harmful interference to DSRC operations. To achieve this goal, interference mitigation techniques must be identified which limit interference risks for incumbent services while providing operators of U-NII equipment confidence that the band will be able support commercially viable activities. As discussed above, the two approaches under consideration do not fully meet these objectives.

As a compromise, Ubiquiti proposes that the Commission establish different rules for indoor and outdoor unlicensed devices and limit U-NII-4 outdoor devices to point-to-point operation. U-NII-4 outdoor devices should be allowed to operate under technical rules equivalent to those under U-NII-3, with the addition of a periodic channel availability check requirement for sensing the presence of DSRC systems. Ubiquiti submits this compromise proposal adequately addresses the concerns of the incumbents and the U-NII-4 community, and should be adopted.

A. Separate Rules for Indoor and Outdoor Operation.

The primary incumbents operate in an outdoor environment and the preponderance of U-NII-4 devices will be operated indoors. At 5 GHz, according to Durgin, Rappaport and Xu (1998)¹⁸ and other studies, structural elements of buildings often offer 10-20 dB of rf isolation between indoor and outdoor environments, providing a significant amount of interference mitigation. It is therefore important not to encumber indoor U-NII-4 devices with the same restrictions as U-NII-4 devices operating in an outdoor environment, where they will be co-located with incumbents.

B. Benefits of Limiting U-NII-4 Outdoor Operation to Fixed Point-to-Point Deployments.

Limiting U-NII-4 to fixed point-to-point deployments with high-gain, directional antennas offers the following interference mitigation benefits for incumbents:

- i) *Reduced risk of increased noise floor by reducing the number of outdoor U-NII-4 devices.* Point-to-point deployments are typically much less dense than point-to-multipoint or peer-to-peer network topologies. By significantly reducing the density

¹⁸ Durgin, G., Rappaport, T.S., and Xu, H., 1998, Measurements and Models for Radio Path Loss and Penetration Loss In and Around Homes and Trees at 5.85 GHz IEEE Transactions On Communications, Vol. 46, No. 11, p. 1484-1496.

of transmitters, the likelihood of causing an increase in the ambient noise will be significantly less.

- ii) *Reduced likelihood of interference by reducing the emissions footprint.* High-gain, directional antennas can limit emissions above a certain elevation and provide interference mitigation for satellite systems. In azimuth, this directionality also can significantly reduce the area of potential interference for ground-based fixed and mobile systems.
- iii) *Reduced likelihood of interference by raising U-NII-4 device antennas above street level.* Fixed point-to-point deployments with high-gain, directional antennas are typically configured for line-of-sight propagation. This often requires antennas to be mounted on telecommunications towers or other tall structures high above the building/tree line and far above street level where DSRC communications systems are designed to operate. In addition to the spatial separation between U-NII antennas and street level, obstructions such as buildings and trees also add significant path losses¹⁹ to mitigate U-NII interference for DSRC systems.
- iv) *Reduced likelihood of interference for U-NII-4 point-to-point devices.* Despite the opportunity provided under U-NII-3 rules for long-distance point-to-point deployments, congestion in the band due to the plethora of point-to-multipoint deployments often makes it difficult locate relatively interference free spectrum in the U-NII-band for high-value point-to-point links to be deployed. Limiting outdoor operation in the U-NII-4 band to point-to-point deployments will provide interference mitigation for both incumbents and U-NII-4 users.

¹⁹

Id.

C. For Outdoor Operation, U-NII-4 Devices Should Employ Automatic Transmit Power Control.

Automatic Transmit Power Control (“ATPC”) is a mechanism which establishes and maintains a device’s transmitted power at only the level necessary to ensure proper link operation for a particular link distance. Such a mechanism can help reduce the likelihood of interference by ensuring that devices are not operated with unnecessarily high levels of transmitted power, maintaining reasonable emissions footprints. By ensuring that U-NII-4 operators will not use excessive transmit power for their links, ATPC can be an effective interference mitigation technique.

D. For Outdoor Operation, U-NII-4 Devices Should Employ a Periodic Channel Availability Check (“PCAC”) in Lieu of a DFS-type Approach

In the U-NII-4-band, the imposition of a DFS-like, real-time check for co-channel incumbents would be disruptive and unnecessary when combined with the other interference mitigation techniques listed above.

- i) Per the NTIA 5 GHz Report, “[f]ederal radar systems operating throughout the 5725-5925 MHz band currently co-exist with lower density point-to-point U-NII devices as well as ISM and other unlicensed devices.” Given that the former ISM (15.247) and current U-NII-3 devices do not employ DFS-like detection and avoidance mechanisms, and that these devices in point-to-point configurations can operate at transmit power levels higher than what the NPRM proposes for the U-NII-4 band, it appears that the interference risk posed by U-NII-4 devices operating without a DFS mechanism would be able to coexist with federal radio location systems.
- ii) DSRC systems will likely be deployed at street level to communicate with automobiles, significantly below the antenna heights commonly required for reliable

line-of-sight, point-to-point telecommunication links. As a large number of DSRC deployments will be in fixed, permanent or semi-permanent locations, there is little need for a real-time check for co-channel DSRC systems. A PCAC, performed at device initiation and at least once every 24 hours thereafter, should be sufficient to detect the modification of existing or deployment of new DSRC systems and allow the U-NII-4 devices to avoid them without overly encumbering U-NII-4 networks with the risk of false detections.

- iii) The detection levels of DSRC signals required for U-NII-4 devices to vacate a channel after the above described PCAC should be 20 dBm above the DSRC 10 MHz channel modulation and coding rate sensitivity of -85 dBm, or 65dBm, based on the threshold required for DSRC Clear Channel Assessment signal busy hold as outlined in the Tiger Team proposal by Ecclesine.²⁰
- iv) Ubiquiti recommends that the duration of the PCAC be thirty seconds. Per a proposal to the Tiger Team by Ecclesine (2013),²¹ the estimated worst case scenario for a DSRC device to be in a CCA busy state – and therefore not transmitting – is ten seconds. By waiting three times longer than the worst case scenario, the PCAC has a very high certainty of detecting presence of DSRC transmissions.

E. U-NII-4 Devices Should Otherwise Be Subject to U-NII-3 Rules

With the exception of the Periodic Channel Availability Check, ATPC and the point-to-point deployment requirements outlined above, Ubiquiti urges the Commission to adopt rules that would allow U-NII-4 devices to operate under the same technical requirements as U-NII-3

²⁰ Ecclesine, P. Proposal for 5850-5925 MHz unlicensed devices, doc.: IEEE 802.11-13/0994r0.

²¹ *Id.*

band point-to-point devices in order to facilitate cross-band operation. This would allow U-NII device manufacturers the ability to leverage existing radio designs while maintaining strong safeguards against harmful interference to primary incumbent devices and services.

Respectfully submitted,

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